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letters a, b, c, etc., but these letters are doubled when the varieties have the weight of races or geographical species, while fossil species and genera are marked by the sign †.

There are points in the classification adopted that may reasonably be objected to. The most important of these is the creation of the group *Homodonta* to include the sirenians, whales and edentates, orders not closely allied, and differing much in the structure of the teeth.

The terms *Secundates* and *Ternates* are new, and are no improvement upon the older terms Unguiculata and Ungulata, the last of which should be understood to comprehend four orders, viz., *Proboscidea*, *Artiodactyla*, *Perissodactyla*, and *Amblypoda*. It is not possible to discover anatomical characters of sufficient importance to warrant the separation of the Bimana from the Simiæ, and it is probable that the Prosimiæ should be placed in the bunotherian series of sub-orders. This last probability is hinted at in the prospectus.

BETTANY'S PRACTICAL BOTANY.¹—This useful little book should have been called First Lessons in the Practical Botany of the Flowering Plants, as it does not even mention the non-flowering plants. In the words of its author "its aim is to aid students in schools and colleges in the practical work of describing flowering plants." Some excellent suggestions are given under "How to Describe Plants." The "Cautions," too, are to the point. Under the successive topics, (1) Root system, (2) Stem and branch system, (3) Leaf system, (4) Inflorescence and floral receptacle, (5) Floral envelopes, (6) Stamens, (7) Pistil and ovules, (8) Fruit and seeds, short definitions and practical directions for the study of specimens are given, which if followed step by step will enable the pupil to observe accurately, and to record what he has seen in proper order and in plain language. Special directions are given in a later chapter for the study of the plants of the principal natural orders, which will doubtless prove useful to the student.

While we do not think it profitable to begin the study of botany with such complex organisms as the flowering plants, we nevertheless welcome this little volume because it can do good service in directing pupils to study *plants* rather than books on plants. The "laboratory method" is so fully carried out that the book can scarcely be studied by itself; the pupil *must* study the plant.—C. E. B.

BALFOUR'S COMPARATIVE EMBRYOLOGY (SECOND NOTICE).—The chapter on the development of the birds is quite long, and the embryology of the chick has been more thoroughly studied than that of any other animal. In the brief chapter on reptiles, the de-

¹ First Lessons in Practical Botany, by G. T. Bettany, M.A., B.Sc., F.L.S. Macmillan & Co., London and New York, 18mo, 104 pp.

velopment of the lizard is chiefly discussed. In the longer chapter on the mammals, several pages are devoted to the early stages in the development of man.

The remaining two-thirds of the book are, in the present stage of embryological science, of much value to the student, as Professor Balfour here attempts the difficult task of stating the general conclusions derived from a survey of all authentic known facts regarding the embryology of animals in general. This is done successfully, the work well deserving the name of a comparative embryology.

In chapter XI, we are presented with a comparative sketch of the mode of formation of the germinal layers, and the notochord, with a notice of the mode of origin of the allantois and amnion. We notice here a little discrepancy in the author's statement regarding the allantoic bladder of the *Amphibia*, which leaves us somewhat in doubt as to the author's final opinion respecting its nature. On p. 108, the author states that the allantoic bladder of the frog "is probably homologous with the allantois of the higher Vertebrates;" on p. 587 he says that it "is homologous with the allantois of the amniotic Vertebrata," on p. 256, it is stated that there is "ample evidence" that the allantois "has taken its origin from a urinary bladder such as is found in *Amphibia*."

Chapter XII, observations on the ancestral forms of the Chordata, is mainly speculative. The author claims that it is clear from *Amphioxus* "that the ancestors of the Chordata were segmented, and that their mesoblast was divided into myotomes, which extended even into the region in front of the mouth. The mesoblast of the greater part of what is called the head in the Vertebrata proper was therefore segmented like that of the trunk." In the *Amphioxus* also the only internal skeleton present is the unsegmented notochord; a "fact which demonstrates that the skeleton is of comparatively little importance for the solution of a large number of fundamental questions." We have for some time inclined to the view that there was a general analogy between the head of an Arthropod and a Vertebrate, more intimate than generally stated, and Balfour's views on this point are of much interest. As to the differentiation of the Vertebrate head, he says on p. 260, "In the Chætopoda, the head is formed of a præoral lobe, and of the oral segment, while in Arthropods a somewhat variable number of segments are added behind to this primitive head, and form with it what may be called a secondary compound head. It is fairly clear that the section of the trunk, which, in *Amphioxus*, is perforated by the visceral clefts, has become the head in the Vertebrates proper, so that the latter forms are provided with a secondary head like that of Arthropods." Hence Balfour considers that the part of the head containing the fore-brain is probably "the equivalent of the

præoral lobe of many Invertebrate forms, and the primitive position of the Vertebrate mouth on the ventral side of the head affords a distinct support for this view."

Gegenbaur's theory that the pairs of cranial nerves represent so many segments, and his segmental theory of the skull, which has replaced the old-fashioned vertebrate theory of the skull, is apparently endorsed by Balfour, who states that "the posterior part of the head must have been originally composed of a series of somites like those of the trunk, but in existing Vertebrates all trace of these, except in so far as they are indicated by the visceral clefts, has vanished in the adult. The cranial nerves, however, especially in the embryo, still indicate the number of anterior somites," etc.

Part I is concluded by a chapter on the mode of origin and homologies of the germinal layers of animals in general, and with a discussion of larval forms.

Part II, or the second half of the book is devoted to *Organogeny*, or the mode of origin of the different organs of the vertebrate body, and this important part is characterized by the same full, critical treatment as in the first part, with consideration of the theoretical bearings of facts, such as seem at least in the main warranted by our present knowledge of the facts.

The work is a most stimulating one, and will greatly advance in English-speaking countries the study of what is the most difficult field of research in biology.

ELLIOTT'S SEAL ISLANDS OF ALASKA.¹—This entertaining and unusually well illustrated monograph of the fur-seal, hair-seal, sea-lion, and walrus is exceptionally well done. The story is really a fascinating one, and the author's sketches of these animals in various ages and altitudes are apparently by far the best that have ever been executed. A number of important hitherto doubtful points have been cleared up by Mr. Elliott, especially those relating to the breeding habits of these creatures. The report, while of particular economic value, is also one of the most important works on natural history which has been published by our Government, containing as it does the results of several years of arduous study and close observations on the bleak, out-of-the-way Prybilov group of islands.

Although the seal is not a fish, the volume not inappropriately appears as a special Bulletin under the direction of the Commissioner of Fish and Fisheries.

¹ U. S. Commission of Fish and Fisheries. Spencer F. Baird, Commissioner. 176. Special Bulletin. A Monograph of the Seal Islands of Alaska. By Henry W. Elliott. Reprinted with additions, from the report on the Fishery Industries of the Tenth Census, with engravings and maps. Washington, Government Printing Office, 1882. 4to, pp. 176